Guide to Pay for Performance Median Student Growth Percentiles SY1112

Student Growth Percentile (SGP) is a normative measure of academic growth. SGP used to calculate Pay for Performance Median SGP is the percentile of a student's 2012 ISAT scale score within a conditional density:

$$\Pr(2012\ ISAT\ Scale\ Score \mid 2011\ ISAT\ Scale\ Score).$$

Quantile regression is used to estimate the conditional density associated with the student's 2011 ISAT scale score (Betebenner, 2008). A linear combination of B-spline seven cubic polynomial functions are used as the conditional quantile functions to accommodate non-linearity, heteroscedasticity, and skewness of the distribution (Betebenner, 2008). Given assessment scores for t occasions, ($t \geq 2$), the τ-th conditional quantile for Y_t based on $Y_{t-1,} Y_{t-2,} \ldots, Y_{1,}$ is given by

$$Q_{Y_t}\left(\tau \middle| Y_{t-1,} \ldots, Y_1\right) = \sum_{j=1}^{t-1} \sum_{i=1}^{3} \varphi_{ij}(Y_j)\beta_{ij}(\tau),$$

where φ_{ij}, $i = 1,2,3$ and $j = 1, \ldots t-1$ denote the B-spline basis functions (Betebenner, 2008). SGP is not correlated with 2011 ISAT scale score; therefore, one cannot make an assumption that a low-achieving student with a SGP of 60 learned as much as a high-achieving student with the same SGP (Betebenner, 2008). Instead, a student with a SGP of 60 has grown as much as 60% of the student's academic peers, all Idaho students having a similar 2011 ISAT scale score at the same grade level.

Median Student Growth Percentile is a median of SGPs. By ordering the SGPs from smallest to largest within the group, denoted by $x_{1,} \ldots, x_{n,}$ the median is given by

$$\tilde{x} = \begin{cases} \left(\frac{n+1}{2}\right)^{th}\ ordered\ value & n\ is\ odd \\ average\ of\ \left(\frac{n}{2}\right)^{th}\ and\ \left(\frac{n}{2}+1\right)^{th}\ ordered\ value & n\ is\ even \end{cases},$$

where n is the number of students in the school.

Pay for Performance Median Student Growth Percentile is a sum of median student growth percentile for each subject, excluding Science. By ascertaining the number of certificated staff in each school and putting the schools in a three-column list (e.g., school name, sum of Median Growth Percentile, certified staff) that is rank ordered by the sum of Median Growth Percentile, *top, upper middle, lower middle, and bottom quarter of schools* are determined.

References

Betebenner, D.W. (2008). Norm- and Criterion-Referenced Student Growth. Retrieved from the National Center for the Improvement of Educational Assessment website: http://www.nciea.org/publications/normative_criterion_growth_DB08.pdf